

Figure I-3a. Sacramento River Downstream of Freeport Bridge Simulated Temperature changes with the plume 14:1 dilution ratio and 25°F temperature difference¹ (Worst-Case Condition²)

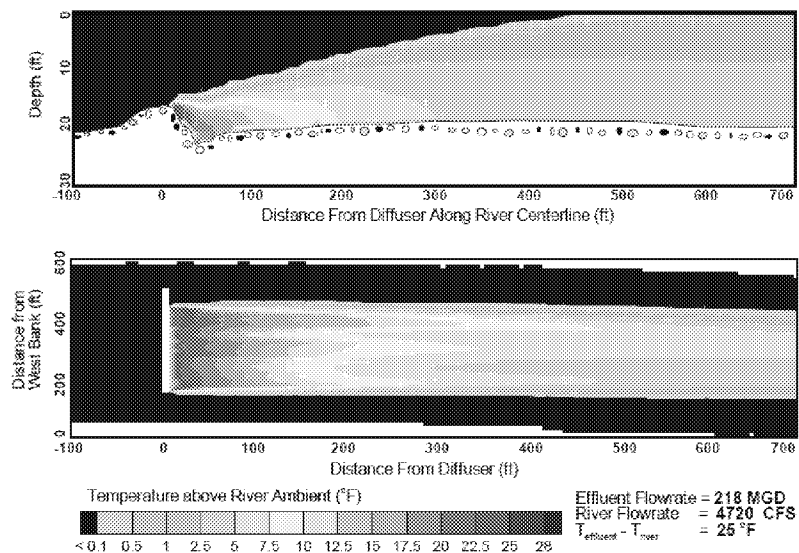
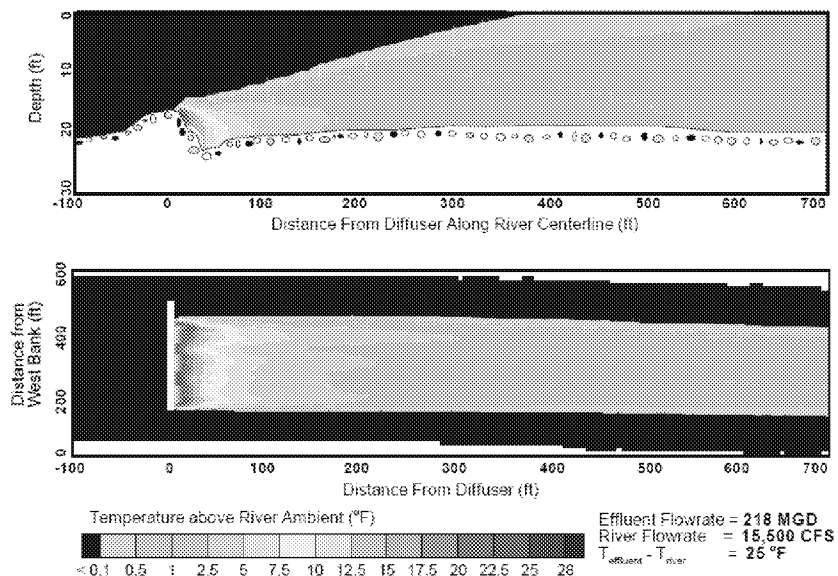


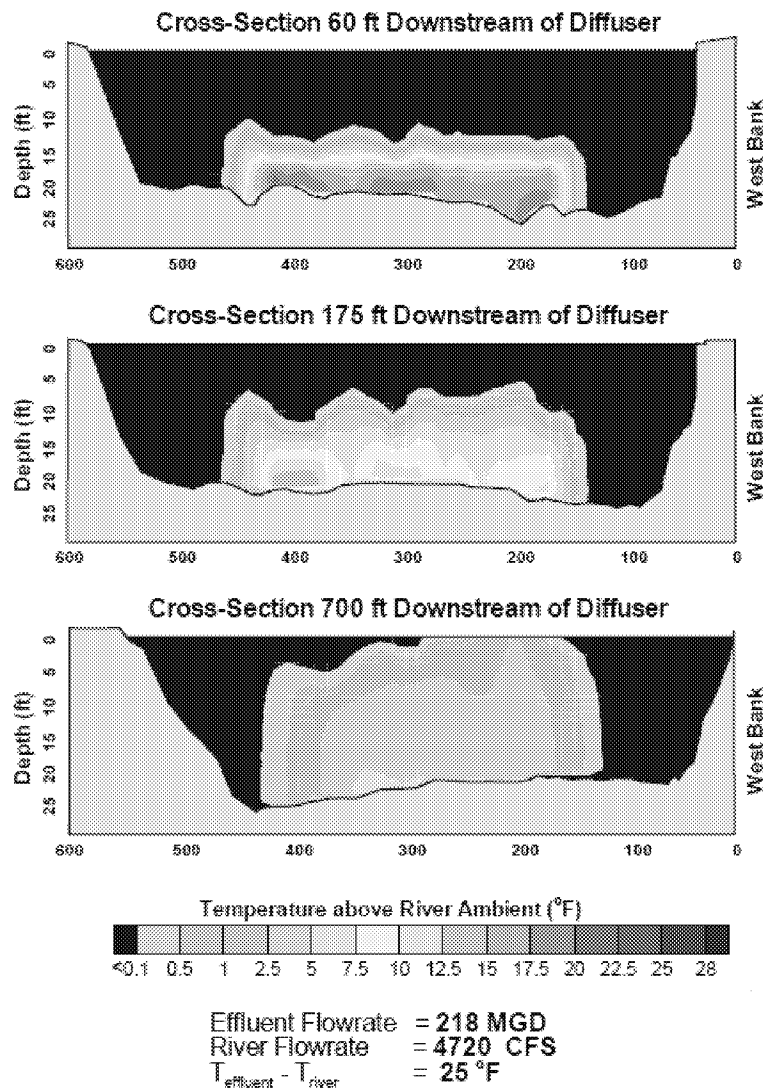
Figure I-3b. Sacramento River Downstream of Freeport Bridge Simulated Temperature changes with the plume 46:1 dilution ratio and 25°F temperature difference⁶ (Typical Condition)



¹2010 study, Appendix B, Attachment A

² "Worst-case is based on the minimum 14:1 (river:effluent) flow ratio and the maximum instantaneous effluent-river temperature differential for each month. The 14:1 flow ratio is expected to occur <1% of the time over the long term." 2010 study, pg. 26

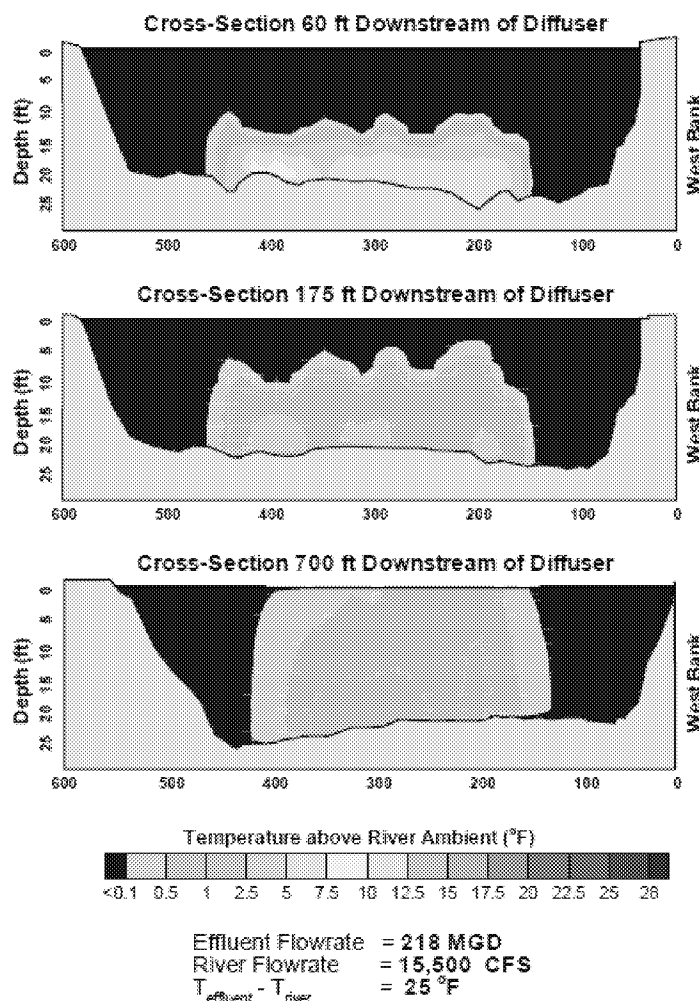
Figure I-4a. Sacramento River Downstream of Freeport Bridge Simulated Temperature changes with the plume 14:1 dilution ratio and 25°F temperature difference ¹(Worst-Case Condition²)



¹ 2010 study, Appendix B, Attachment A

² "Worst-case is based on the minimum 14:1 (river:effluent) flow ratio and the maximum instantaneous effluent-river temperature differential for each month. The 14:1 flow ratio is expected to occur <1% of the time over the long term." 2010 study, pg. 26

Figure I-4b. Sacramento River Downstream of Freeport Bridge Simulated Temperature changes with the plume 46:1 dilution ratio and 25°F temperature difference ¹ (Typical Condition)²



Far-Field Thermal Plume Modeling

Thermal Plan Objective 5.A.(1)c requires that, “No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.” SRWTP complies with this objective. While Thermal Plan Objectives 5.A.(1)a and 5.A.(1)b have been established to protect aquatic life from near-field thermal effects, Thermal Plan Objective 5.A.(1)c is required to guard against far-field temperature changes.

Under fully mixed conditions in the far-field, Table I-2 demonstrates that Sacramento River temperatures would not change measurably whether SRWTP is operated to meet

¹ 2010 study, Appendix B, Attachment A

² “Typical is based on the median (50th percentile) or near-median flow ratio of 46:1 and the median monthly or period effluent-river temperature differential based on data collected by the SRCSD from February 13, 1993 through June 30, 2010. This condition approximates conditions that would occur on a regular basis.” 2010 study, pg. 26

the Thermal Plan objectives or with the exceptions. In the 2013 study, incremental temperature changes were modeled for the 82-year (1922-2003) hydrologic period of record when complying with the Thermal Plan objective 5.A.(1)a year-round (20°FΔT) and the proposed exception (25°F ΔT) at a 181 mgd (ADWF) SRWTP discharge condition. The modeling demonstrated there were minimal changes in temperature whether SRWTP complied with the Thermal Plan objective or if the exception was allowed. At the 50th percentile there was no change in downstream temperature whether complying with the 20°FΔT objective or with the 25°F ΔT exception. At the 99.91 percentile the maximum differential was only 0.09°F (December).¹

Table I-2. Percent exceedance of modeled lower Sacramento River water temperatures for the 82-year (1922-2003) hydrologic period of record when complying with the Thermal Plan objective 5.A.(1)a year-round (20°FΔT) and the current exception (25°F ΔT) at a 181 mgd (ADWF) SRWTP discharge condition.²

Percent Exceedance	River Temperature (°F)			
	20°F ΔT Instantaneous	25°F ΔT, Instantaneous	Background Temperature	Change from Background ¹
January				
50%	47.93	47.93	47.66	0.27
99.91%	41.64	41.70	41.11	0.59
February				
50%	49.07	49.07	48.88	0.19
99.91%	41.87	41.88	41.77	0.11
March				
50%	54.20	54.20	54.00	0.20
99.91%	44.73	44.73	44.62	0.11
April				
50%	58.03	58.03	57.82	0.21
99.91%	50.02	50.02	49.89	0.13
October				
50%	62.10	62.10	61.72	0.38
99.91%	54.84	54.84	54.37	0.47
November				
50%	55.30	55.30	54.90	0.40
99.91%	47.80	47.84	47.40	0.44
December				
50%	49.64	49.64	49.27	0.37
99.91%	41.73	41.82	41.28	0.54

¹ Change from background is resultant fully mixed river temperature minus background temperature when operating to the current exception to Thermal Plan objective 5.A.(1)a when it applies during the months October through April.

¹ The findings and conclusions relating to Code of Federal Regulations, title 40, section 125.73(a) are based on the entire thermal effect of the discharge.

² 2013 study, Table 11.

- **The thermal plume does not increase predation.**

The relative abundance of predatory fishes was highest at the diffuser and plume sites compared to other reference sites. However, a very low percentage of the predatory fish hold for more than a few hours at the diffuser; rather, most fish were determined to be moving through the area rather rapidly. Overall, only a small proportion of tagged predators occurred in the boundary of the SRWTP thermal plume, of which only one striped bass (i.e., <1% of all tagged predators tracked in the array) held in the boundary of the thermal plume for an extended period of time.

Based on the findings of the temperature studies, large numbers of predatory fishes are not holding at the diffuser site due to elevated water temperatures. Predatory fishes present near the SRWTP diffuser are typically not holding for extended periods of time and their numbers and location within the channel cannot be explained by SRWTP discharge rate or plume temperatures.

Any predation that may be occurring on ESA-listed fishes near the SRWTP diffuser is occurring at rates no higher than elsewhere in the lower Sacramento River, upstream and downstream of the diffuser site.

- **No demonstrable negative impacts to aquatic organisms when considering cumulative effects**

Consideration of cumulative effects of all stressors presently acting upon the aquatic species assessed is inherent in the temperature studies as the analyses are based on the environment in which the species assessed exist, including actual river temperatures resulting from all actions that affect temperature. In addition, the assessments and findings have taken into account all other environmental stressors acting upon the populations of aquatic organisms within the lower Sacramento River (including the ESA-listed status of certain species), into which SRWTP discharges.

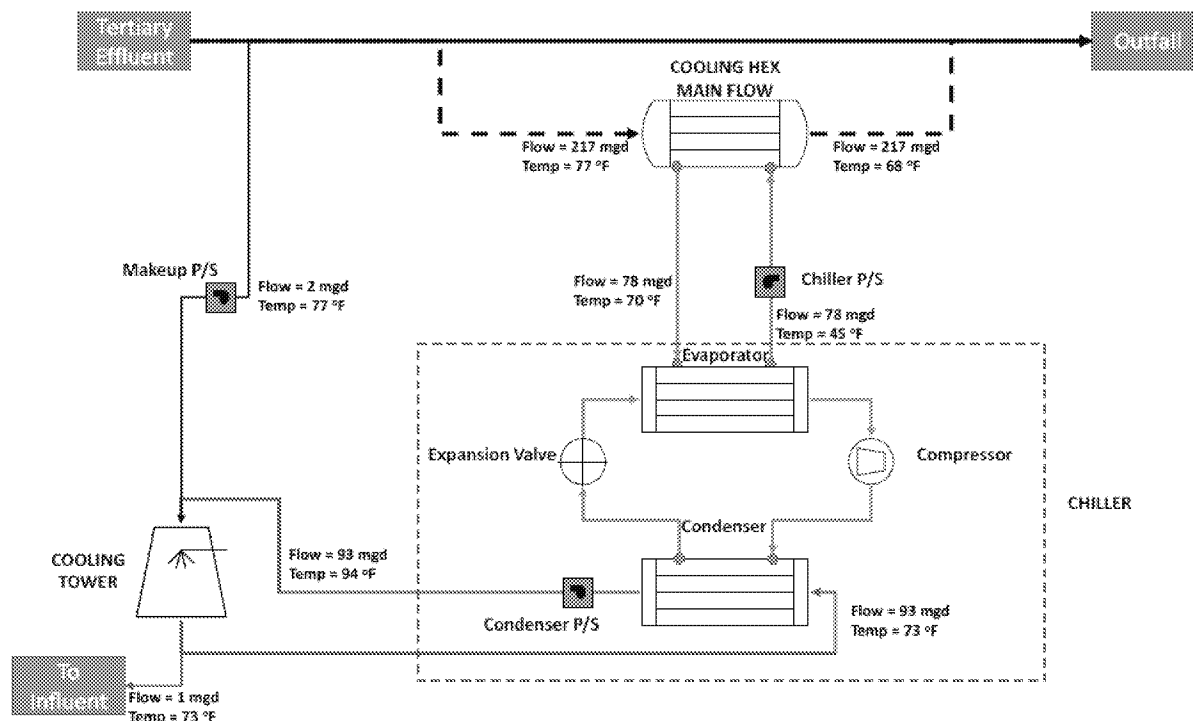
Aquatic organisms passing through the near-field thermal plume area would not experience any chronic, adverse thermal effects when SRWTP is operating under the current Thermal Plan exceptions and alternate effluent and receiving water limitations included in this Order. Because no chronic adverse thermal effects to any of the representative, sensitive, and important species assessed would occur when passing through the near-field plume area, there are no effects to cumulate with other adverse effects or stressors to the aquatic organisms. Similarly, in the far-field area, at and downstream of where the SRWTP effluent discharge initially becomes fully mixed with lower Sacramento River flow, the negligible thermal changes in the river from operating under the alternative temperature limitations would not exacerbate or cumulate with other stressors to aquatic life in the far-field and thus would not make other stressors worse (e.g., water quality stressors, predation, food web dynamics).

- **Compliance with the Thermal Plan objectives would substantially increase the carbon footprint of the Facility for no demonstrable water quality improvement.**

A water-cooled chiller system would be needed to comply with the Thermal Plan objectives. Evaporative coolers are generally used in these situations, but in this case would not work. Evaporative coolers rely on evaporative cooling to reduce the temperature of the discharge. However, the time of year when the cooling is needed for SRWTP is during cooler months, which would make the evaporative coolers ineffective. A schematic of a chiller system

including water cooled chillers, cooling towers, and effluent heat exchangers is shown in Figure I-5.

Figure I-5. Process Flow and Temperature Schematic for Effluent Cooling



The total project costs for thermal compliance are estimated to be approximately \$638,000,000 escalated to the midpoint of construction.

The largest operating cost for the project is electric power, estimated to be 70 MW at full load. SRWTP currently has an electrical power draw of approximately 12 MW. The estimated energy cost is approximately \$5 million per year.¹

- **State and federal fishery agencies provided technical assistance**

Concurrence from the fishery agencies is not required for the Central Valley Water Board to grant exceptions to the Thermal Plan, however Central Valley Water Board staff requested technical assistance. The fishery agencies participated during development of the 2013 and 2015 Temperature studies. The fishery agencies technically assisted the Discharger in developing the proper goals, questions, and objectives to be addressed by the Temperature Studies, and to design the field study elements to obtain the needed information for the study questions.

After the Temperature Studies were completed, the fishery agencies provided technical assistance for the review of the studies. See section 4. Permitting/Litigation History for details regarding the fishery agencies comments and recommendations.

¹ Memorandum submitted by the Discharger on 11 December 2015, "Project Cost and Schedule for Compliance with Thermal Plan without Seasonal Exception".

- **State Water Board concurrence with Thermal Plan exceptions**

The Thermal Plan states that, "Regional Boards may, in accordance with Section 316(a) of the Federal Water Pollution Control Act of 1972, and subsequent federal regulations including 40 CFR 122, grant an exception to Specific Water Quality Objectives in this Plan. Prior to becoming effective, such exceptions and alternative less stringent requirements must receive the concurrence of the State Board." (Thermal Plan, General Water Quality Provisions) To satisfy this requirement, on 14 January 2016, Central Valley Water Board staff provided the rationale and technical justification for allowance of the Thermal Plan exceptions to the State Water Board.¹ State Water Board staff reviewed the information and provided a memorandum on 11 March 2016, stating that, "The information submitted appears adequate to support the need for a Thermal Plan exception for the SRWTP. Therefore, following approval action by the Central Valley Regional Water Quality Control Board (Regional Water Board), State Water Board staff will recommend concurrence by the State Water Board for the Thermal Plan exceptions."

4. Permitting/Litigation History

a. 2010 Permit Renewal with Thermal Plan Exceptions

i. Background

- The Central Valley Water Board, on 26 May 1989, adopted Resolution 89-094 granting exceptions to objectives 5A(1)(a) and 5A(1)(b) of the Thermal Plan. Objective 5A(1)(a) was relaxed such that the temperature of the discharge shall not exceed the natural receiving water temperature by more than 25°F from 1 October through 30 April. Objective 5A(1)(b) was waived.
- The State Water Board, on 20 September 1990, adopted Resolution 90-103 approving and modifying Central Valley Water Board Resolution 89-094. State Water Board Resolution 90-103 approved the exception to objective 5A(1)(a), but deferred a decision on the exception to 5A(1)(b). It required the Discharger to study the feasibility of meeting objective 5A(1)(b). The Discharger submitted the required study in a report in October 1991, with supplements in November and December 1991. Based on the study, the State Water Board found that the heat load contributed by the Dischargers effluent did not pose a threat to aquatic life, including salmon, at any season. The State Water Board adopted Resolution 92-82 on 22 October 1992, granting the Discharger a conditional exception to objective 5A(1)(b) for five years. Specifically, the exception allowed a maximum increase of 2 °F in a zone that does not exceed 25 percent of the cross sectional area of the main river channel at any point. The exception also limited any excursion of objective 5A(1)(b) to no more than one hour per day as an average in any thirty-day period when the upstream temperature of the Sacramento River is 65 °F or greater. The Central Valley Water Board adopted Resolution 5-00-192 approving use of these exceptions. These requirements were implemented in Waste Discharge Requirements Order 5-00-188 adopted in August 2000.
- As a condition of Order 5-00-188, the Discharger completed and submitted a study assessing the thermal impacts of its discharge in the Sacramento River to the

¹ Memorandum from Pamela Creedon, Executive Officer, Central Valley Water Board to Tom Howard, Executive Director, State Water Board, 14 January 2016

National Marine Fisheries Services (NMFS), titled “Thermal Effects of Sacramento Regional Wastewater Treatment Plant Discharges on Migrating Fishes of the Sacramento River, February 2005.” The thermal impact assessment recommended continuation of the existing thermal plan exceptions. The 2005 Thermal Study was reviewed by NMFS staff and they did not indicate any concerns with the Thermal Plan exceptions.

ii. 2010 Temperature Study

- In July 2010, the Discharger submitted a temperature study developed by Robertson-Bryan, Inc., “Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment Plant”, (2010 study), and requested revised Thermal Plan exceptions. The study consisted of thermal assessment and fisheries assessment. The thermal assessment characterized the temperatures in the vicinity and downstream of the diffuser at the design flow rate under worse-case and typical flow conditions, and evaluated the temperature conditions against the thermal tolerances, exposure times, and migration paths of fishes that pass the diffuser. The fisheries assessment addressed 1) the potential for blockage/significant delay of upstream spawning migrations of adult anadromous fish that could be caused by the near-field thermal plume, 2) potential for population-level effects resulting from mortality in fish caused by acute exposure, and 3) potential for population or community-level effects on fish resulting from far-field thermal effects.

Based on the dynamic model performed by Flow Science, under all near-field conditions modeled, a zone of passage approximately 75-100 feet wide occurs along the west bank and 175-200 feet wide occurs along the east bank. Also the warmest part of the thermal plume is located close to the bottom of the river where few fish are expected to be exposed and exposure time ranges from seconds to minutes. Actively swimming fishes can readily avoid unfavorable temperatures within the plume by swimming around or over the portions of the plume. Therefore, a thermally tolerable zone of passage exists for all actively swimming fish species that pass the diffuser and the thermal plume would not cause lethality to emigrating fishes or have adverse population- or community-level effects to the anadromous or resident fishes. In addition, far-field temperature modeling results indicate that under fully-mixed conditions the discharge would not adversely affect aquatic life resources of the Sacramento River.

iii. Fishery Agencies Comments/Recommendations

- During the 2010 permit renewal process, Central Valley Water Board staff coordinated with the fishery agencies regarding the Discharger’s proposed Thermal Plan exceptions. Staff issued a public scoping document regarding aquatic life and wildlife preservation related issues and provided the scoping document for public review and comment on 28 April 2010.

NMFS¹ stated, “...listed species have sufficient swimming abilities to readily avoid the thermal component of this stressor.” However, NMFS expressed concerns that the area of thermal mixing at the outfall diffuser had a potential to attract non-native

¹ Letter from NMFS to the Central Valley Water Board dated 12 September 2010 (NMFS 2010).

predators of the listed species under the Endangered Species Act (ESA)¹ and recommended a predation study be performed. USFWS² recommended the exception from Order 5-00-188 be retained and no further exception be permitted. Additionally, USFWS recommended the Discharger initiate planning to address future increases in the discharge with consideration for changes in the Sacramento River as a result of climate change without the need for sequential Thermal Plan exceptions. USFWS was also concerned about the potential of thermal discharges to create winter thermal refugia for non-native predators and the lack of information for the protection of delta smelt, and recommended the renewed 2010 permit include a temperature study requirement.

- The recommendations from the fishery agencies were incorporated into the tentative NPDES permit that was issued on 3 September 2010. The tentative permit continued the Thermal Plan exceptions from Order 5-00-188 and required the Discharger to conduct a new temperature study to evaluate the concerns regarding predation. NMFS, USFWS, and CDFW concurred with the temperature requirements in the tentative permit. In their comments to the tentative Order, NFMS reiterated its recommendation about the predation study; USFWS acknowledged the incorporation of the thermal study and consented the permit provisions were protective of fish and wildlife related beneficial uses; and CDFW supported the inclusion of the temperature study to evaluate the protection of delta smelt and the Sacramento River biota.

b. California Sportfishing Protection Alliance (CSPA) Litigation

Following the 2010 permit renewal, CSPA filed a petition with the State Water Resources Control Board (State Water Board). The State Water Board reviewed the permit and issued Water Quality Order WQ-2012-0013 in December 2012 that for the most part upheld the permit with minimal revisions required. The State Water Board Order did not address or require changes to thermal limitations. CSPA subsequently filed a lawsuit with the Sacramento Superior Court (Court). One of the issues raised by CSPA was related to the allowance of Thermal Plan exceptions in the 2010 Permit.

In October 2014, the Court ruled that the 2010 Permit failed to include the proper findings for a Thermal Plan exception and ordered the Central Valley Water Board to vacate the Thermal Plan exceptions and reconsider the issue of whether Thermal Plan exceptions may be granted.

c. Permit Amendment in 2015 continuing Thermal Plan Exceptions

i. 2013 Temperature Study and Fishery Agencies Comments

- After adoption of the 2010 Order, the Discharger contracted with Robertson-Bryan, Inc. to begin development of a work plan for conducting the temperature study. The fishery agencies participated in the development of the study work plan, and in March 2013, the Discharger submitted the required temperature study, "Temperature Study to Assess the Thermal Impacts on the Sacramento Regional Wastewater Treatment

¹ Specifically, Sacramento River winter-run Chinook Salmon (*Oncorhynchus tshawytscha*), Central Valley spring-run Chinook salmon (*O. tshawytscha*), California Central Valley steelhead (*O. mykiss*), and the Southern distinct population segment of North American green sturgeon (*Acipenser medirostris*).

² Letter from USFWS to Central Valley Water Board dated 18 August 2010 (USFWS 2010).

Plant Discharge on Aquatic Life of the Lower Sacramento River” (2013 study), to address the concerns of the fishery agencies. The study determined that:

- Fish species (Chinook salmon, steelhead, delta smelt, green sturgeon, longfin smelt, Sacramento splittail, hardhead, Pacific lamprey, or river lamprey), phytoplankton, zooplankton, and benthic macroinvertebrates (BMI) would not experience thermal exposures that would exceed lethal or sub-lethal thresholds.
 - The thermal plume near the diffuser did not block/delay upstream migration of adult fishes or downstream migration of larval and juvenile fishes. The discharge upon its full mixing with river flow would not block upstream adult migration of Chinook salmon or other migratory fish species.
 - Large numbers of predatory fishes were not holding at the diffuser site due to elevated water temperatures. The study found that predation rates on Chinook salmon smolts emigrating past the diffuser were no higher than elsewhere in the lower Sacramento River, upstream and downstream of the diffuser site.
 - The migratory and resident predatory fishes tracked did not congregate and hold within the plume for continuous periods of time sufficient to result in exposure durations that would cause acute or chronic toxicity, based on plume water quality.
 - Discharges did not increase river temperatures, upon full mixing, by magnitude and duration that would be of concern for aquatic life in the lower Sacramento River or Delta.
- NMFS¹ reviewed the study in June 2014 and found that, “...Chinook salmon, steelhead, green sturgeon, as well as the other aquatic species examined migrating past the diffuser location and within the thermal plume would not experience thermal exposure that would exceed lethal or sub-lethal thresholds...” , “...juvenile Chinook salmon are not delayed or blocked by the thermal plume in their downstream migration and that based on the tracks of the individual fish, do not exhibit any apparent erratic behavior when encountering the thermal plume.”, and “...the predation upon juvenile Chinook salmon within the close vicinity of the diffuser appeared to be minimal to nonexistent.”
 - USFWS² reviewed the study and provided comments on 18 December 2013, which stated, “The final report of the temperature study is generally complete and is mostly consistent with the Work Plan developed with stakeholders that was completed in June 2011. There are, however, a few omissions in the study which prevent the Service from fully evaluating the thermal effects of the facility on delta smelt.” The USFWS recommended that the Discharger modify the current study or provide additional analyses on delta smelt. In response, the Discharger provided an amendment to the analysis in May 2015 as discussed below.

¹ Letter from NFMS to Central Valley Water Board dated 2 June 2014 (NMFS 2014).

² Letter from USFWS to Central Valley Water Board dated 18 December 2013 (USFWS 2013).

ii. 2015 Delta Smelt Addendum

- In May 2015, the Discharger submitted an addendum developed by Robertson-Bryan, Inc, "Temperature Study to Assess the Thermal Impacts on the Sacramento Regional Wastewater Treatment Plant Discharge on Aquatic Life of the Lower Sacramento River: Delta Smelt Addendum" (2015 Delta Smelt addendum). This addendum assessed the potential direct and indirect effects of the thermal discharge on all delta smelt life stages such as adults, larvae, and post-spawn adults, and on delta smelt critical habitat. The study concluded that the discharge "...would not cause lethality to individual delta smelt, result in chronic, adverse sublethal effects, adversely modify delta smelt critical habitat, prevent sustainability or recovery of the delta smelt population, or eliminate access to critical habitat primary constituent elements."

iii. Central Valley Water Board's Findings in July 2015 Amended Order

The federal regulations do not require approval of the Thermal Plan exceptions by the fishery agencies. In this case however, the Central Valley Water Board coordinated with the fishery agencies to provide additional support for the Central Valley Water Board's findings. The Central Valley Water Board found the Discharger's studies adequately demonstrate the following:

- The thermal plume from the discharge will show no direct acute or chronic thermal effects on fishes (including larval and juvenile life stages), benthic macroinvertebrates, or plankton. The thermal exposures, either in the near-field plume area or far-field downstream areas would not exceed lethal or sub-lethal effect thresholds for aquatic life.
- There is a sufficient zone of passage such that the thermal plume from the discharge will not result in blockage or significant delay upstream migration of adult fishes or downstream migration of larval and juvenile fishes. The discharge upon its full mixing with river flow would not block or delay upstream adult migration of fish species.
- Predatory fishes were not holding in the warmer water plume near the diffuser, where they could prey upon ESA-listed fishes as they migrate past the diffuser.
- Fishes were not holding within the plume area due to the elevated water temperature for sufficient periods of time to experience toxicity, based on plume water quality. Drifting organisms were also not exposed to elevated temperatures to experience toxicity.

The Discharger had demonstrated that Effluent and Receiving Water Limitations based on the Thermal Plan are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and wildlife in and on the body of water into which the discharge is made. This demonstration had shown the Effluent and Receiving Water Limitations for temperature are sufficient, considering the cumulative impact of the thermal discharge together with all other significant impacts on the species affected, to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made.

In July 2015, the Central Valley Water Board adopted the above findings and Thermal Plan exceptions based on studies required by Order R5-2010-0114-04 completed in March 2013 and May 2015, and comments received from USFWS, CDFW and NMFS.

iv. Court Ruling in October 2015

Following the permit amendments and additional Thermal Plan findings adopted by the Central Valley Water Board in July 2015, CSPA challenged the Board's continued use of the Thermal Plan exceptions. In October 2015, the Court found that the 2013 study met the federal regulatory standard and supported continued use of the exceptions. The Court however, found the 2015 Delta Smelt addendum failed to conclude that the exceptions would support the protection and propagation of a balanced indigenous community of shellfish, fish, and wildlife, and did not contain a finding that the Thermal Plan is more stringent than necessary.

As a result, the Court ordered the Central Valley Water Board to again consider whether the Thermal Plan exceptions are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. The Court also noted that the record contained no evidence showing whether State Water Board concurrence with the exceptions was obtained, or not required.

v. Temperature Study: Synthesis, Supplemental Analysis and Findings Report

In December 2015, the Discharger submit a report, "Regional San Temperature Study: Synthesis, Supplemental Analysis and Findings Report " (2015 report). The report provided the science-based findings that directly address the regulatory standard (40 CFR section 125.73(a)) for the granting of exceptions to the Thermal Plan for SRWTP and alternative limitations. In addition to the conclusions of the previous temperature studies, the report included characterization of a balanced, indigenous community of aquatic organisms in the lower Sacramento River, and factors that affect such a community. It established a context for analyses and conclusions regarding the thermal effects of the SRWTP discharge, and the adequacy of exceptions and alternative limitations under applicable federal regulatory standards.

The 2015 Addendum and 2015 Supplemental Report show that the thermal plume as permitted does not: 1) have lethal or sublethal effects; 2) block or delay migration of fishes due to thermal conditions; 3) attract predatory fishes; 4) cause acute or chronic toxicity to fish; 5) increase river temperatures that would be of concern for aquatic life. Therefore, these conclusions support the Central Valley Water Board's staff finding that the Thermal Plan objectives are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of fish, shellfish, and wildlife in and on the Sacramento River and Delta. The studies further support the Central Valley Water Board's finding that the alternative limitation, considering the cumulative impact of the thermal discharge together with all other significant impacts on species affected, will assure the protection and propagation of a balanced, indigenous community of fish, shellfish, and wildlife in and on the Sacramento River and Delta.

vi. Fishery Agency Comments on 2015 Delta Smelt Addendum

- In December 2015, USFWS¹ reviewed the addendum and found that the addendum addressed the areas of information that were previously omitted, referenced all relevant and up-to-date scientific literature on the ecology and thermal tolerance of Delta smelt, and the conclusions provided in the addendum were clear, logical and supported by the modeling outputs. Therefore, USFWS completed the technical review of the thermal effects of SRWTP and would not require any additional information or studies.
- In January 2016, CDFW² reviewed the addendum and supported both the purpose and development of the study. Based on the data gathered during the study, CDFW agreed with the conclusions that the thermal plumes resulting from discharges from the SRWTP would not cause a blockage of the river channel, related to fish passage. No additional studies would be needed to evaluate SRWTP's thermal plume impacts at the point of discharge.

¹ Letter from USFWS to Central Valley Water Board dated 28 December 2015 (USFWS 2015).

² Letter from CDFW to Central Valley Water Board dated 19 January 2016 (CDFW 2016).